



AMENDMENT UNDER 37 C.F.R. § 1.111
Appln. No.: 10/646,709

Docket No: Q76993

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A semiconductor device comprising in order:
a semiconductor substrate which acts as a first copper diffusion barrier layer,
a first low dielectric constant film constituted essentially by an organic low dielectric constant material having a specific dielectric constant not greater than 4,
a SiO₂ layer,
a second copper diffusion barrier layer,
and an interlayer dielectric film formed above said second copper diffusion barrier layer, said interlayer dielectric film including a lamination consisting essentially of an adhesive film constituted essentially by a silicon-based compound having an aromatic ring in a molecule of said silicon-based compound having a specific dielectric constant of 2.5 to 2.6 and a second low dielectric constant film constituted essentially by an organic low dielectric constant material having a specific dielectric constant not greater than 4 and contacting said adhesive film.
2. (original): The semiconductor device as set forth in Claim 1, wherein said aromatic ring is a fused ring.



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3. (original): The semiconductor device as set forth in Claim 1, wherein said silicon-based compound includes a benzocyclobutene unit in a molecule thereof.
4. (original): The semiconductor device as set forth in Claim 1, wherein said silicon-based compound contains a silylene unit in a molecule thereof.
5. (original): The semiconductor device as set forth in Claim 1, wherein said silicon-based compound is a polymer formed through polymerization of a monomer containing a divinylsiloxane bisbenzocyclobutene unit.
6. (original): The semiconductor device as set forth in Claim 5, wherein said silicon-based compound is a polymer formed through plasma polymerization of said monomer.
7. (original): The semiconductor device as set forth in Claim 1, wherein said organic low dielectric constant material does not contain an Si-H bond.
8. (original): The semiconductor device as set forth in Claim 7, wherein said organic low dielectric constant material is one of methylsilsesquioxane and SiOC.

9. (original): The semiconductor device as set forth in Claim 1, wherein said lamination is formed by depositing said adhesive film and said low dielectric constant film in this sequence.

10. (original): The semiconductor device as set forth in Claim 1, further comprising a metal wiring formed on said semiconductor substrate, wherein said lamination is formed on said metal wiring.

11. (original): The semiconductor device as set forth in Claim 10, wherein said adhesive film is formed in contact with said metal wiring, and further said low dielectric constant film is formed on said adhesive film.

12. (previously presented): The semiconductor device as set forth in Claim 10, wherein a metal diffusion barrier is formed on said metal wiring, and said adhesive film and said low dielectric constant film are formed in this sequence on said metal diffusion barrier.

13. (original): The semiconductor device as set forth in Claim 10, wherein a cap metal is provided on an upper surface of said metal wiring, and said adhesive film is formed in contact with said upper surface of said cap metal.

Claims 14-24 (canceled).

25. (previously presented): A semiconductor device comprising a semiconductor substrate and an interlayer dielectric film formed above said semiconductor substrate, said interlayer dielectric film including a lamination consisting essentially of an adhesive film constituted essentially by a silicon-based compound having an aromatic ring in a molecule of said silicon-based compound having a specific dielectric constant of 2.5 to 2.6 and a low dielectric constant film constituted essentially by an organic low dielectric constant material having a specific dielectric constant not greater than 4 and contacting said adhesive film, wherein a second adhesive film constituted essentially by a silicon-based compound having an aromatic ring in a molecule of said silicon-based compound having a specific dielectric constant of 2.5 to 2.6 is formed between a SiCN layer and said low dielectric constant film.

26. (previously presented): A semiconductor device comprising a semiconductor substrate and an interlayer dielectric film formed above said semiconductor substrate, said interlayer dielectric film including a lamination consisting essentially of an adhesive film constituted essentially by a silicon-based compound having an aromatic ring in a molecule of said silicon-based compound having a specific dielectric constant of 2.5 to 2.6 and a low dielectric constant film constituted essentially by an organic low dielectric constant material having a specific dielectric constant not greater than 4 and contacting said adhesive film, wherein a second adhesive film constituted essentially by a silicon-based compound having an aromatic ring in a molecule of said silicon-based compound having a specific dielectric constant of 2.5 to 2.6 is formed between a SiO₂ layer and said low dielectric constant film.

27. (previously presented): A semiconductor device comprising:

a semiconductor substrate, and

a metal wiring and an interlayer dielectric film which are formed on said semiconductor substrate,

said interlayer dielectric film including a multi-layered structure consisting of:

a diffusion barrier film preventing diffusion of the metal out of said metal wiring,

an adhesive film formed directly on said diffusion barrier film, and

a low dielectric constant film formed directly on said adhesive film,

said adhesive film being constituted by a silicon-based compound having an aromatic ring in a molecule of said silicon-based compound, and

said low dielectric constant film being constituted essentially by an organic low dielectric constant material having a specific dielectric constant not greater than 4.

28. (previously presented): The semiconductor device as set forth in Claim 27, wherein said diffusion barrier film is constituted by SiCN.

29. (previously presented): The semiconductor device as set forth in Claim 27, wherein said silicon-based compound includes a benzocyclobutene unit in a molecule thereof.

30. (previously presented): The semiconductor device as set forth in Claim 27, wherein said silicon-based compound contains a silylene unit in a molecule thereof.

31. (previously presented): The semiconductor device as set forth in Claim 27, wherein said silicon-based compound is a polymer formed through polymerization of a monomer containing a divinylsiloxane bisbenzocyclobutene unit.

32. (previously presented): The semiconductor device as set forth in Claim 27, wherein said organic low dielectric constant material is methylsilsesquioxane.

33. (previously presented): The semiconductor device as set forth in Claim 27, wherein said organic low dielectric constant material is a silicon-containing organic compound.

34. (previously presented): The semiconductor device as set forth in Claim 27, wherein said organic low dielectric constant material is a SiOC.

35. (previously presented): The semiconductor device as set forth in Claim 27, wherein said interlayer dielectric film is formed on said metal wiring.